

CLAIMS

What is claimed is:

1. A method of electronically tracking a plurality of items stored in a container, wherein each of the plurality of items comprises an electronic identifier, the method comprising the steps of:
  - obtaining the electronic identifier for each of the plurality of items;
  - computing a data representation as a function of each of the plurality of electronic identifiers; and
  - transmitting the data representation to the container for storage at the container.
2. The method of claim 1 further comprising the steps of:
  - repeating the obtaining and computing steps at a subsequent time to determine a second data representation;
  - retrieving the data representation from the container; and
  - comparing the data representation from the container with the second data structure to thereby identify changes in the items stored in the container.
3. The method of claim 1 further comprising the step of transmitting the data representation to a server.
4. The method of claim 3 wherein the transmitting step comprises transmitting an identifier for the container to the server with the data representation.
5. The method of claim 4 further comprising the steps of:
  - repeating the obtaining and computing steps at a subsequent time to determine a second data representation;
  - retrieving the data representation from the server; and
  - comparing the data representation from the container with the second data representation to thereby identify changes in the items stored in the container.

6. The method of claim 1 wherein the obtaining, computing and transmitting steps are performed by an RFID reader.
7. The method of claim 1 further comprising the steps of:
  - obtaining container data structures from each of a plurality of containers stored on a pallet;
  - computing a pallet data representation as a function of each of the container data structures; and
  - storing the pallet data representation at the pallet.
8. The method of claim 1 further comprising the step of digitally signing the data representation prior to the transmitting step.
9. The method of claim 1 wherein the data representation comprises a checksum.
10. The method of claim 1 wherein the data representation comprises a cyclic reduction code (CRC).
11. The method of claim 1 wherein the function is a hash function.
12. The method of claim 1 wherein the function comprises a message digest algorithm.
13. The method of claim 1 wherein the data representation comprises a compressed, high entropy, data representation of the contents within the container.

14. A computer-implemented method of electronically tracking a plurality of items stored in a container with an RFID reader, wherein each of the plurality of items and the container are associated with one of a plurality of RFID tags each having an RFID identifier, the method comprising the steps of:
  - obtaining RFID identifiers from each of the plurality of RFID tags associated with the plurality of items;
  - computing a checksum as a function of each of the RFID identifiers with the RFID reader; and
  - transmitting the checksum from the RFID reader to the RFID tag associated with the container for storage.
15. The method of claim 14 further comprising the step of digitally signing the checksum with a private key associated with the RFID reader prior to the transmitting step.
16. The method of claim 14 further comprising the steps of:
  - repeating the obtaining and computing steps at a subsequent time to determine a second checksum;
  - retrieving the checksum from the container; and
  - comparing the checksum from the container with the second checksum to thereby identify changes in the items stored in the container.
17. The method of claim 16 further comprising the step of communicating with a second RFID reader when the second checksum does not match the checksum from the container to identify crosstalk between the RFID reader and the second RFID reader.
18. The method of claim 17 wherein the communicating step comprises transmitting a list of the RFID identifiers obtained in the obtaining step to the second RFID reader.
19. The method of claim 17 wherein the communicating step comprises the steps of:
  - receiving a list of RFID identifiers from the second RFID reader; and
  - comparing the list of RFID identifiers from the second RFID reader with the RFID identifiers received during the obtaining step to identify any duplicate identifiers.

20. The method of claim 14 wherein the transmitting step comprises transmitting an identifier for the container to the server with the checksum.
21. The method of claim 20 further comprising the steps of:
  - repeating the obtaining and computing steps at a subsequent time to determine a second checksum;
  - retrieving the checksum from the server; and
  - comparing the checksum from the container with the second checksum to thereby identify changes in the items stored in the container.
22. The method of claim 21 further comprising the step of notifying a central server of a result of the comparing step.
23. A device for electronically tracking a plurality of items stored in a container, wherein each of the plurality of items and the container are associated with RFID tags each having an RFID identifier, the device comprising:
  - means for obtaining RFID identifiers from each of the RFID tags associated with the plurality of items;
  - means for computing a checksum as a function of each of the RFID identifiers associated with the plurality of items; and
  - means for transmitting the checksum to the RFID tag associated with the container for storage.
24. The device of claim 23 further comprising means for digitally signing the checksum with a private key associated with the device prior to the transmitting step.
25. The device of claim 23 further comprising means for comparing the checksum received from the container with a second checksum computed by the computing means as a function of RFID tags associated with the plurality of items received from the obtaining means to thereby identify changes in the items stored in the container.
26. The device of claim 23 further comprising means for communicating with a central server.

27. An RFID reader for communicating with a plurality of items stored in a container, wherein each of the plurality of items and the container are associated with one of a plurality of RFID tags each having an RFID identifier, the RFID reader comprising:  
a transceiver configured to communicate with the plurality of RFID tags;  
and  
a processor operatively configured to communicate with the transceiver to obtain RFID identifiers from each of the RFID tags associated with the plurality of items, to compute a data structure as a function of each of the RFID identifiers associated with the plurality of items, and to transmit the data structure to the RFID tag associated with the container via the transceiver for storage at the container.
28. The RFID reader of claim 27 wherein the processor is further configured to digitally sign the data structure prior to transmitting the data structure to the RFID tag associated with the container.
29. The RFID reader of claim 27 further comprising a network interface configured to communicate with a central server, and wherein the processor is further configured to transmit the data structure to the central server via the network interface.
30. The RFID reader of claim 29 wherein the processor is further configured to subsequently retrieve the data structure from the central server for comparison with a second data structure computed from a second reading of the RFID identifiers associated with the plurality of items.
31. The RFID reader of claim 27 wherein the RFID reader is a handheld reader.
32. The RFID reader of claim 27 wherein the RFID reader is associated with a portal.

33. A system for tracking a plurality of items stored in a container, wherein each of the plurality of items and the container are associated with one of a plurality of RFID tags each having an RFID identifier, the system comprising:
- a data network;
  - an RFID reader interfacing with the data network, wherein the RFID reader is configured to obtain RFID identifiers from each of the RFID tags associated with the plurality of items, to compute a checksum as a function of each of the RFID identifiers associated with the plurality of items, and to transmit the checksum to the RFID tag associated with the container via the transceiver for storage at the container; and
  - a central server configured to communicate with the RFID reader via the data network to receive the checksum and to store the checksum in a database associated with the central server in conjunction with the RFID identifier associated with the container.
34. The system of claim 33 wherein the data network is a wireless network.
35. An electronic signal modulated on a carrier wave, wherein the electronic signal corresponds to an RFID tag associated with a container for a plurality of items, each item having an associated RFID item tag, the electronic signal comprising:
- a first data field corresponding to an RFID identifier of the RFID tag;
  - a second data field corresponding to an item count of the plurality of items;
  - and
  - a third data field comprising a checksum, wherein the checksum is calculated as a function of the RFID item tags for each of the plurality of items.
36. A digital storage medium having electronic data stored thereon, wherein the electronic data corresponds to a container for a plurality of items, each item having an associated RFID item tag, the electronic data comprising:
- a first data field comprising an RFID identifier of container;
  - a second data field comprising an item count of the plurality of items; and
  - a third data field comprising a checksum, wherein the checksum is calculated as a function of the RFID item tags for each of the plurality of items.

37. An RFID tag associated with a container for a plurality of items, each item having an associated RFID item tag, the RFID tag comprising:
- a first data field corresponding to an RFID identifier of the RFID tag;
  - a second data field corresponding to an item count of the plurality of items;
  - and
  - a third data field comprising a checksum, wherein the checksum is calculated as a function of the RFID item tags for each of the plurality of items.